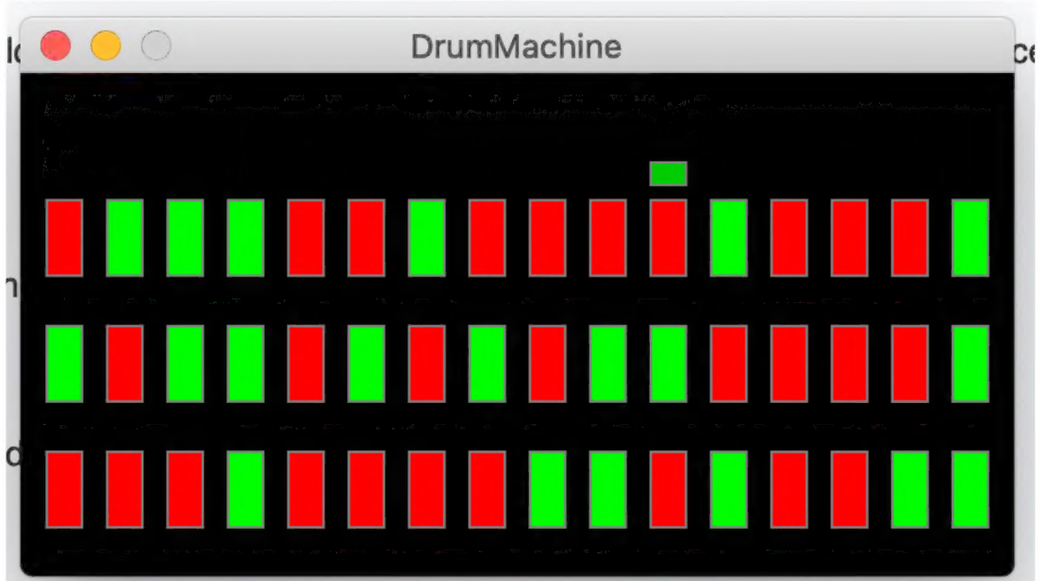
2025 EDITION

SOUND
INFORMATICS

**OXFORD UNIVERSITY,
ENGLAND, UK.**

PROF FRANK APPIAH.



A Typical Sound Visual

SOUND VISUALS

The Basics

Section 01

WHAT IS SOUND VISUALS?

01 INTRODUCTION TO SOUND

Sound is a dynamic hearable wave made from vibrations and causes of further vibrations.

(1) Sound is something you can hear.
(2) The sound of voices.
(3) Sound comes from music.
(4) Sound comes from talking.
(5) Sound comes from noises.
(6) Sound comes from radio.
(7) Sound comes from television.
(8) Sound comes from film
(9) Sound can be interference.
(10) Sound can be controlled by volume.
(11) Sound can be recorded.
(12) Sound can be stored by electrical means.
(13) Sound can be playback.

01 Building sound: Types

Building your own sound

One can build sound but what makes one sound different from the one in terms of notes and vibrate actions.

(1) Bang : Sound like explosion.

(2) Clank: Two metals knocking together.

(3) Crash: Sound like object falling and breaking on ground.

(4) Creak: Sound like door opening.

(5) Rattle: Sound like loose object hitting another object.

(6) Squeak: Sound like noise from a mouse.

(7) Thud: Sound like a heavy falling object.

Sound made from musical instruments like drums, trumpet, piano, guitar, beat box machine, electromagnetic beat wave instruments, electronic device sound (\b), electronic information sound machine, etc.

01 Sound Understanding

This sound type seems to be good.

This sound type seems to be bad.

This sound type seems to be exciting.

This sound type seems to be interesting.

This sound type seems to be warm.

This sound type seems to be asleep.

Section 02

Sound in Computer

02 What is sound in computing?

Computing Sound Terms

The three basically terminologies includes:

(1) *Sound tracks*: The music that is played during a television programme or a **CD of music**.
(2) *Sound effects*: The special recorded sounds in film, television, radio and music.
(3) *Sound Card*: The part of computer that changes information into sound for human hearing.

In doing this computation, *sample players* of three count are used to trigger a click-tick instrument.
There are clickable shift spaces that are visualised and that collect beat tempos (duration changes of [beat+1%16]). The sound visuals are 16 and that creates 16 notes in total. Each selected shift note clicked create a note sequence of three different series or variants. There are total of 48 notes in the sound instrument.

02 What is sound in computing?

Clickable Sound Visuals

Simply, a clickable sound visual creates a triggered note block but only plays out audio in the off note block. These notes stored in samplers as sound information need to be patched to the audio output before they can be played. The line out is set to stereo.

02 What is sound in computing?

Playback

In order to achieve playback, sound visuals need to be stored and reloaded after program execution. A language is made from the shift space to create a storage space for further processing. The language is made from false and true sequences of about 48 boolean space to cater for the 48 note triggers. Each boolean value is separated by a comma and end of line has no comma in a storage file called .**svb**, sound vision beats.

This section will not describe the code base for achieving this milestone. The purpose for this training section is to teach a few sound visuals about 27 and its language.

Section 03

Sound Language and Visualisations.

03 Sound Language

What is Sound Language?

Sound language is a language made up of boolean set of sample triggers from actions of buttons.

A sound language is stored in a file with extension, *.svb*. It is loaded as strings of false and true values. It is further separated into each boolean value. It is then set to the sample variables. This operation is performed three times as there are three sample players.

03 Sample Variables

Sample Variable Becomes Sampler

The sound language made up false or true values cannot be used in string form. It needs to be converted into a boolean code value so it is parsed into one.

This happens during the set loop of sample variable in incremental fashion. Sample variable block for each sampler is done.

The *loadSound* method is used in coding.

03 Sampler

Sampler Coding

A *sampler* is a note trigger that plays a note through an audio out like Speaker with tempo intervals of duration in seconds. A sampler is a voice and waveform of recorded sound ,and a state-trigger also there is only one speaker attached to the computer. A sampler come into effect during an instrument class instantiation.

03 Sampler

Sampler Coding

The coding instrument has two methods: noteOn and noteOff. It is called Tick *Instrument*. You can call yours anything of purpose or meaning.

NoteOn calls the note trigger of the sampler if the sample variable is set true or otherwise. NoteOff does the actual playing of note sound through the audio output, speaker. I can hear the sound, can you?

03 Making Sound Visual : Button

Clickable UI Button

Buttons are UI drawable entities and can either a rectangle shape or oval shape.

The button is a draw key yet to be hit upon to make beat or sound.

UI Button Row

Buttons made with either a rectangle or oval shape are arranged in 16 drawable entities and in 3 rows.

It is left in unselected state upon instantiation.

03 Making Colour Shift Visual : Button

Clickable UI Button

Button in its pressed state is stated as sound key pressed.

This is a physical mouse pressed or touchscreen touched state.

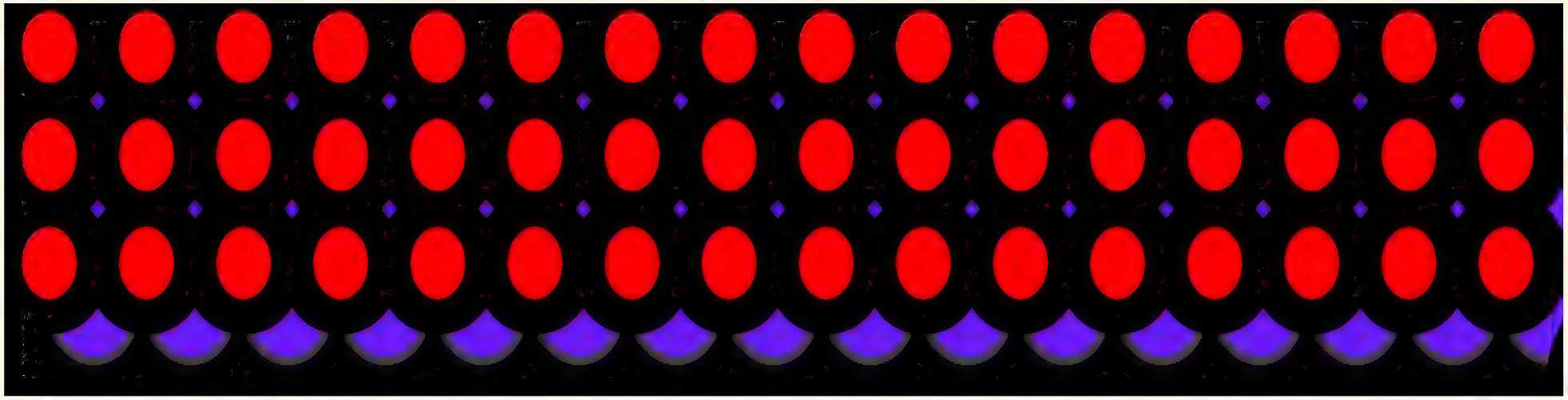
Step Shift Visualisation

There is a step function that creates a stimuli of colour shift with the sound keys to create a sort of internal colour shift. This in turn makes an animation of colours shifting back and forth from previous.

03 Main Hypothesis

Hypothesis Development

This visual is used only to hype the project and the real visual is a clickable entity in application. The current image is mainly a hypothetical visualisation. The use of inductive reasoning is used in making visual predictions of this image in a more general version.



Empty Colour Shifts: Red Colour State

03 Theory-Driven Hypothesis

Theory Driven

The theory-driven hypothesis is based on visual short-term memory of buttons comprising of two filled colours (default green and red) and background image.

The clicked state is a green filled shape of rectangle or oval and the unchecked state is a red filled colour.

01 Internal Validity

Degree of Validity

This is about 54% in degree of validity as it provides a good test score for a causal hypothesis. The system observation is quite reliable as it has about percentage of 48 to which this project can be repeated under similar conditions.

03 System Obervsation

Concept Definition

Tasks are completed in a computer and the concept definition is a collection of systematic behaviour in controlled tasks. It has a cognitive behaviour in nature.

03 Operational Definition

Operational Definition

A computer application is called SoundVision is used to capture a screen visuals of clickable tick instrument that creates sound. This gives the measure of abstract concept and makes it concrete for the purpose of research study.

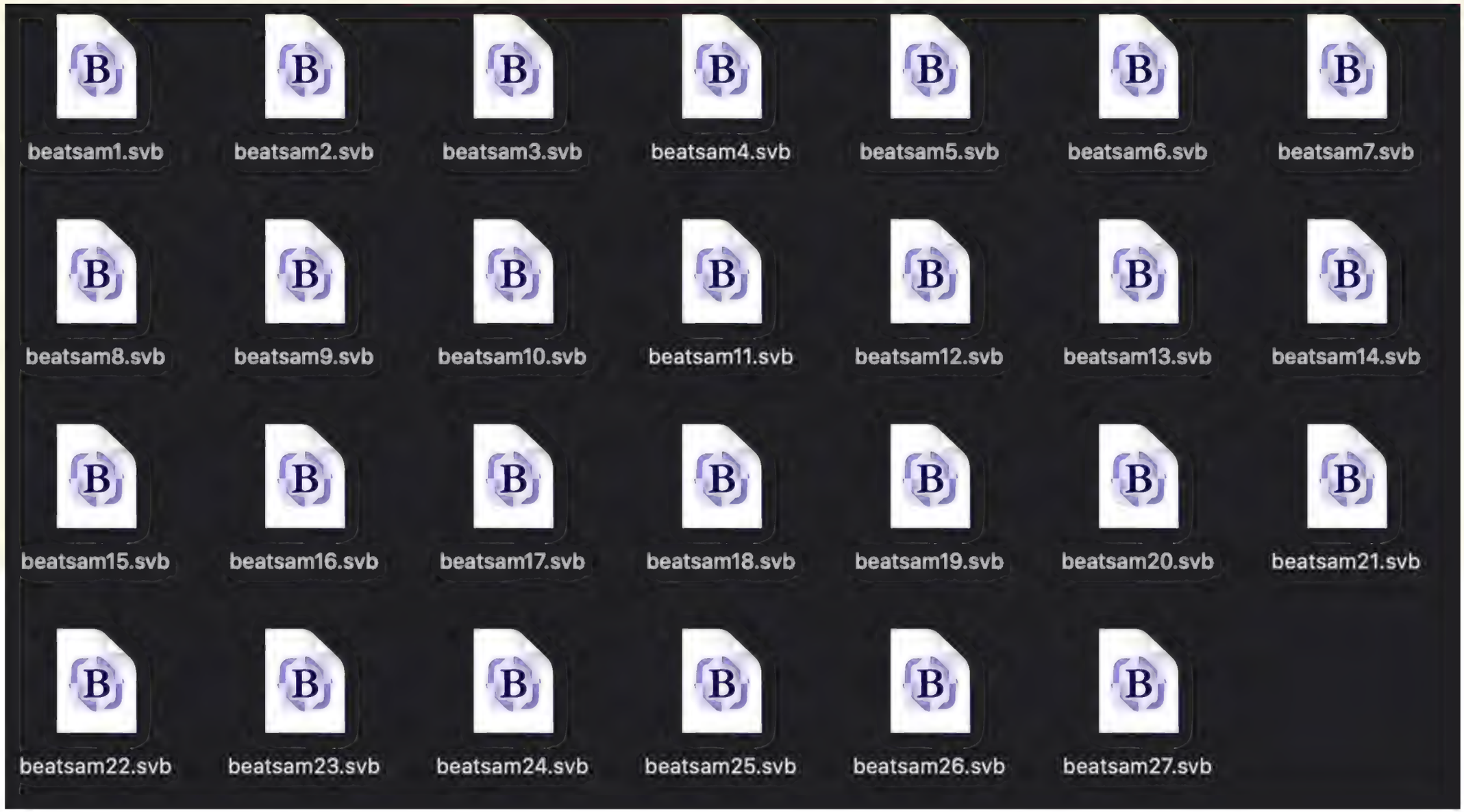
03 Research Design

Research Study

The variable used in research are *langvisu*. This variable has numeric apprehensions and categorical so as to group individuals into different categories to make comparison. The behaviours of question of interest in this study is about 4.

03 Experiment

Experiment Group



03 Experiment

Corresponding Experiment Group

03 CASE STUDY

CASE Study

A case study is performed to gain changing information on more sound visuals THAT behave different and it is not exhibited by an individual. A case cannot be generalised to all individuals.

03 Causal Study

LangVisu Group

Let's make some sound if you have sound vision app. You can get from my GitHub page. Search for SoundVision in my page space.

We will look at 27 languages and visual outputs. I may provide a recorded sound of the beats later at my http://archive.org@frankappiah page.

Lang 1 and Visu 1.

Lang 2 and Visu 2.

Lang 3 and Visu 3.

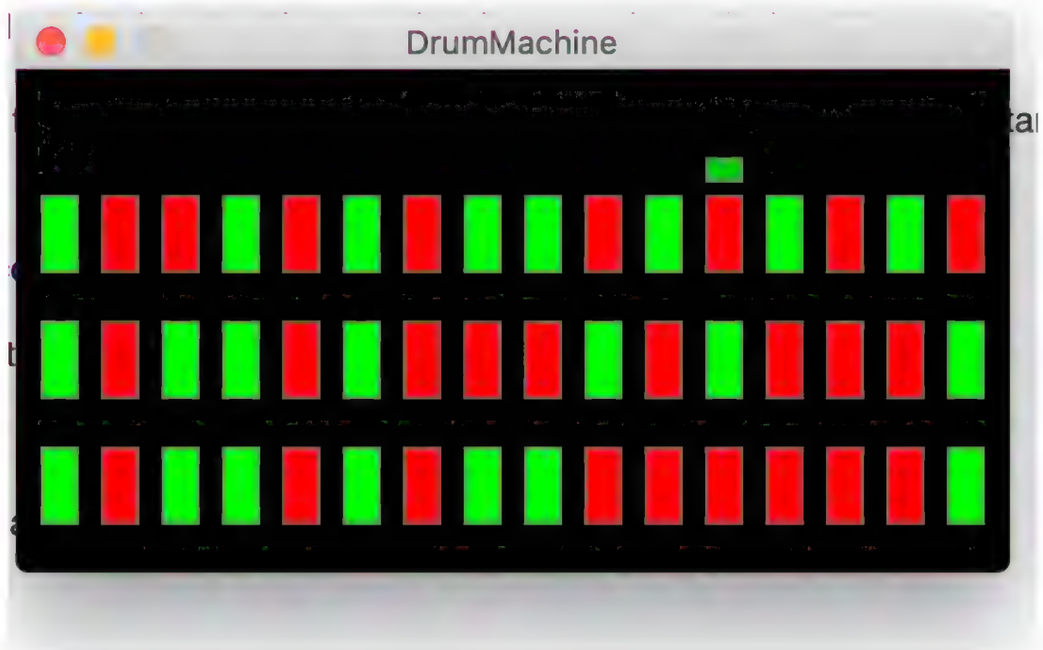
Lang 4 and Visu 4.

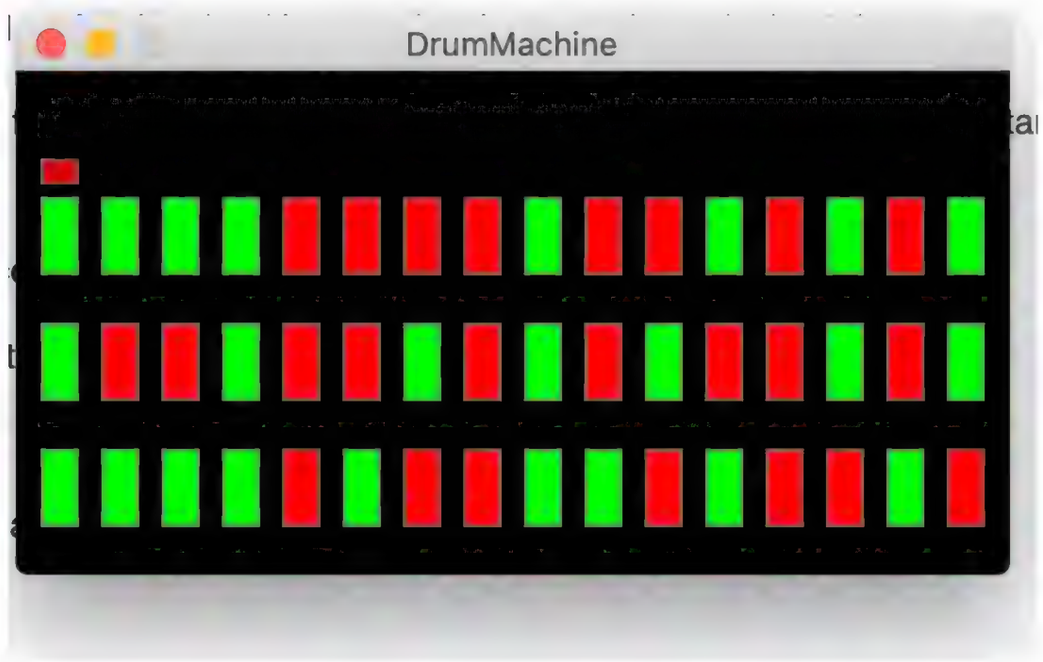
Lang 5 and Visu 5.

Lang 6 and Visu 6.

.....

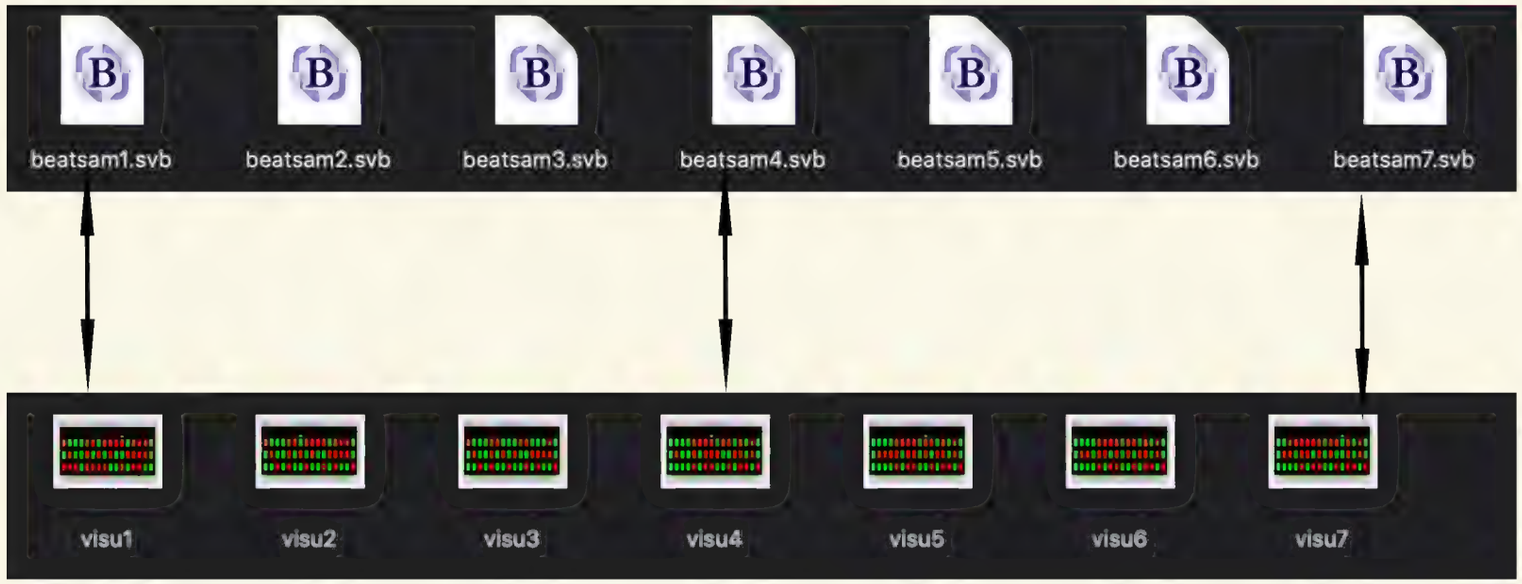
Lang 27 and Visu 27.





03 LangVisu 1

Language and Visual Outputs



There are about 7 corresponding participant images both the language and visual outputs in this experimental group with variable, langvisu 1. The case-level of participation images is from 1 to 7. The control group of unselected participatory information is about 20.

03 CASE 1: LangVisu 1

Language and Visual Outputs

Lang1:

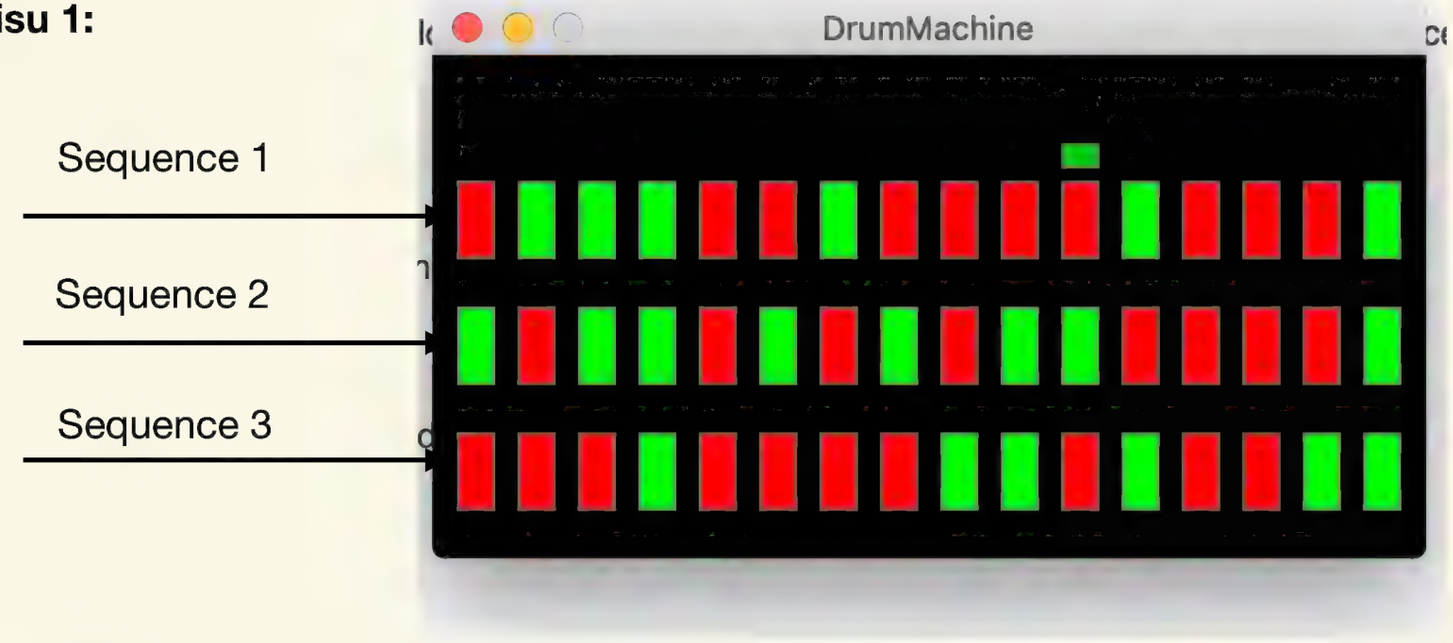
Sequence 1: false,true,true,true,false,false,true,false,false,false,false,true,false,false,false,true

Sequence 2: true,false,true,true,false,true,false,true,false,true,true,false,false,false,false,true

Sequence 3: false,false,false,true,false,false,false,false,true,true,false,true,false,false,true,true

File Name : Beatsam1.svb

Visu 1:



File Name: visu1.png

03 CASE 1: Information 1

Language and Visual Outputs

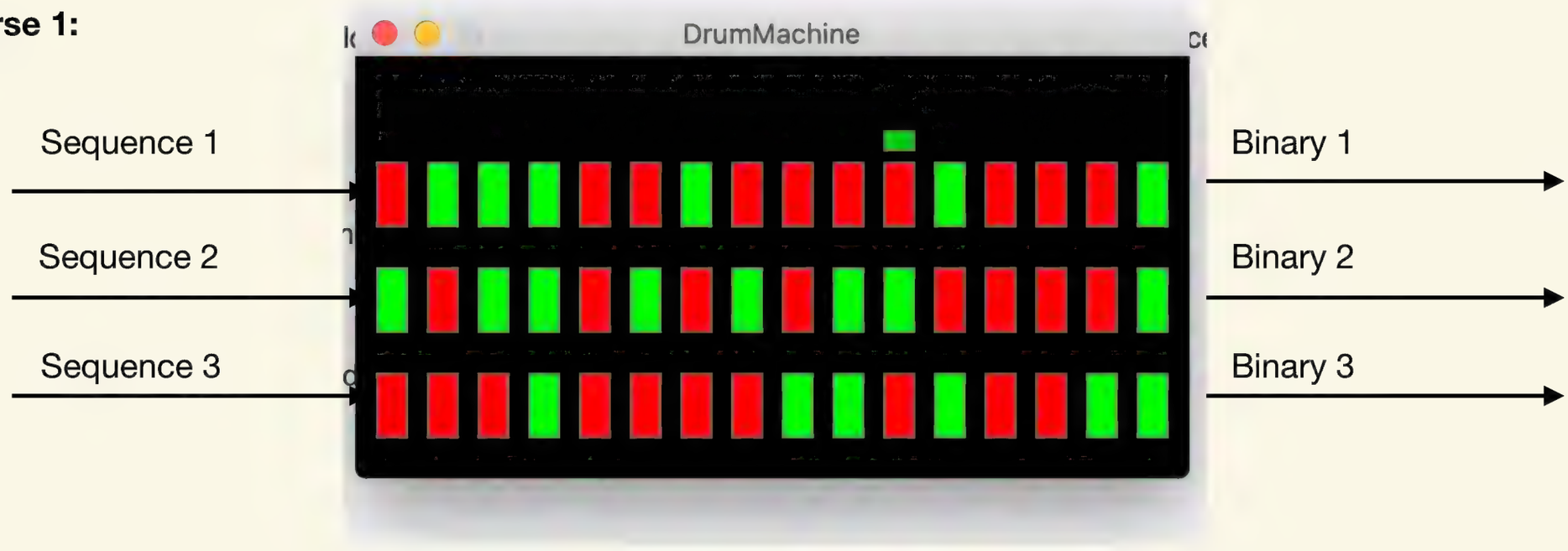
Lang1:

Binary 1: [0111001000010001]

Binary 2: [1011010101100001]

Binary 3: [0001000011010011]

Parse 1:



03 CASE 1: LangVisu 2

Language and Visual Outputs

Lang2:

Sequence 1: true,true,false,false,false,false,false,false,true,false,false,true,false,true,false,true

Sequence 2:true,false,false,true,false,false,true,false,true,false,true,true,false,true,false,true

Sequence 3:true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false

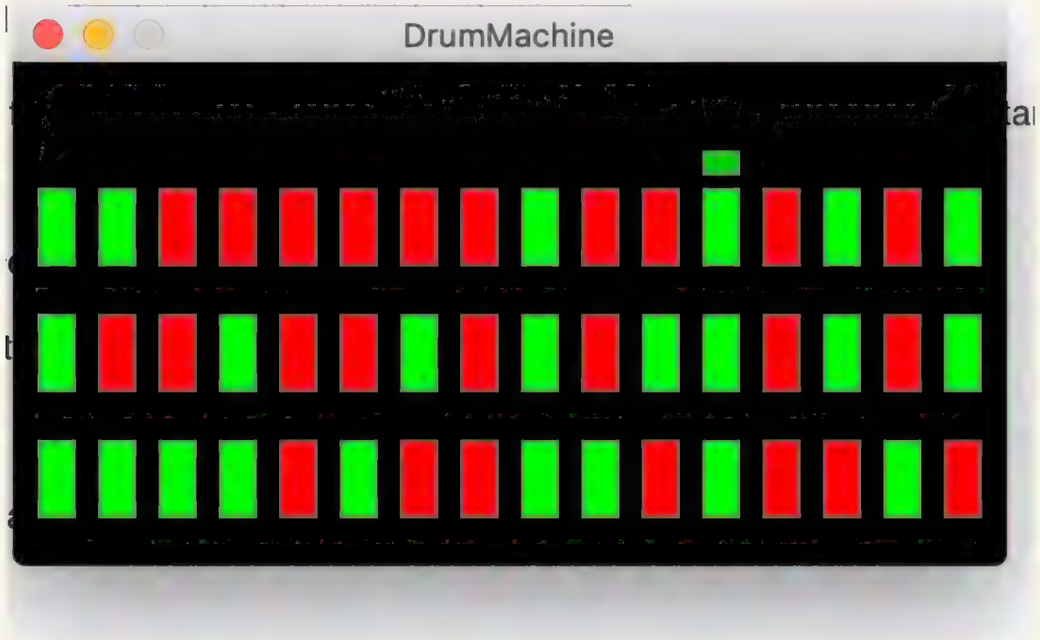
File Name : Beatsam2.svb

Visu 2:

Sequence 1

Sequence 2

Sequence 3



File Name: visu2.png

03 CASE 1: Information 2

Language and Visual Outputs

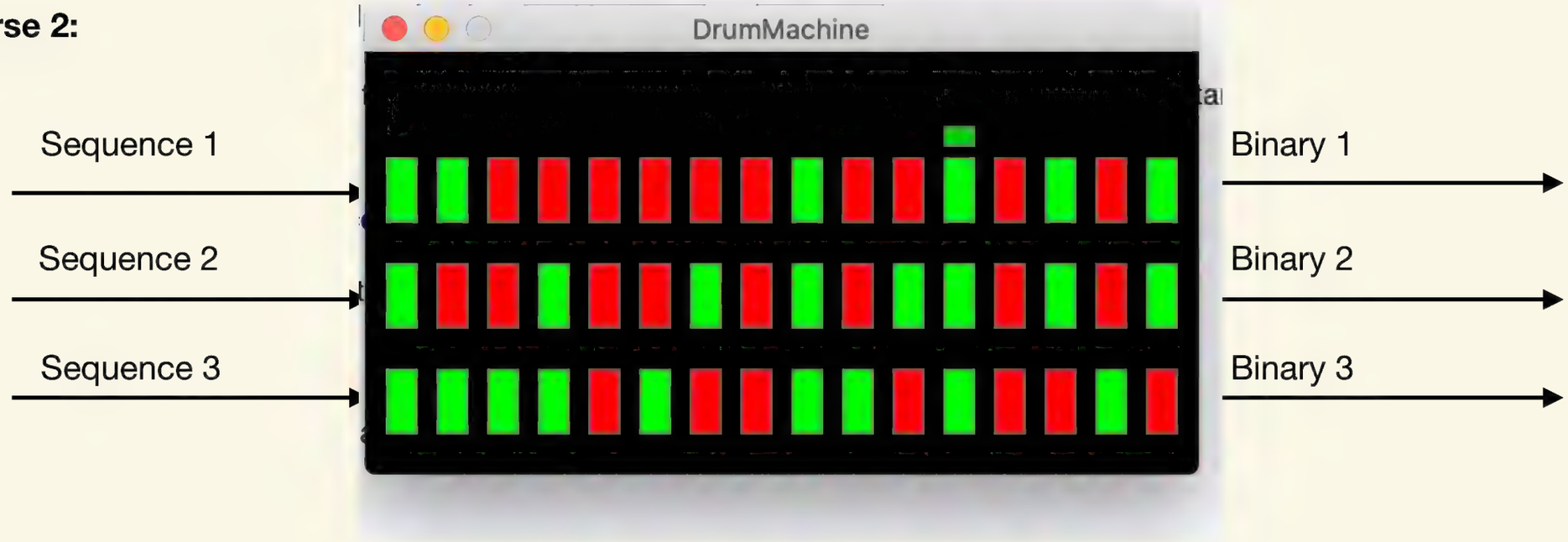
Lang2:

Binary 1: 1,1,0,0,0,0,0,0,1,0,0,1,0,1,0,1

Binary 2:1,0,0,1,0,0,1,0,1,0,1,1,0,1,0,1

Binary 3:1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0

Parse 2:



03 CASE 1: LangVisu 3

Language and Visual Outputs

Lang3:

Sequence 1:false,true,true,true,false,false,true,true,true,false,false,true,true,true,false,true

Sequence 2:true,false,true,true,false,true,false,true,false,true,true,false,false,false,false,true

Sequence 3: true,true,false,true,false,true,true,false,true,true,false,true,false,true,true,false

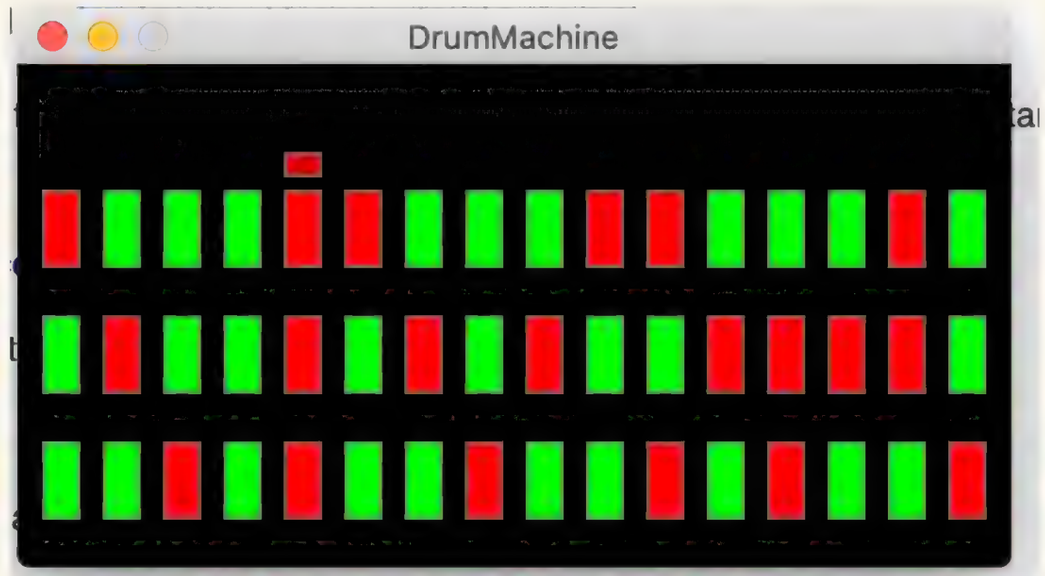
File Name : Beatsam3.svb

Visu 3:

Sequence 1

Sequence 2

Sequence 3



File Name: visu3.png

03 CASE 1: Information 3

Language and Visual Outputs

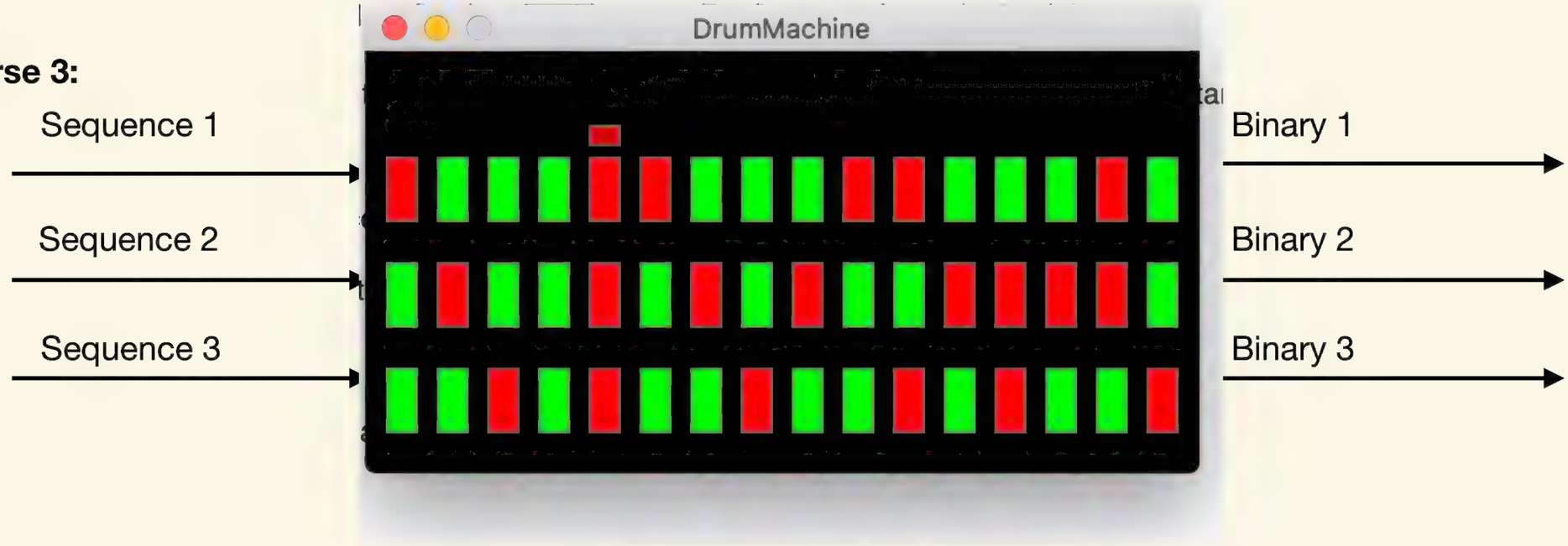
Lang3:

Binary 1:0,1,1,1,0,0,1,1,1,0,0,1,1,1,0,1

Binary 2:1,0,1,1,0,1,0,1,0,1,1,0,0,0,0,1

Binary 3: 1,1,0,1,0,1,1,0,1,1,0,1,0,1,1,0

Parse 3:



03 CASE 1: LangVisu 4

Language and Visual Outputs

Lang4:

Sequence 1:true,true,true,true,false,false,false,false,true,false,false,true,false,true,false,true

Sequence 2:true,false,true,true,false,true,false,false,false,true,true,false,false,true,false,true

Sequence 3:true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false

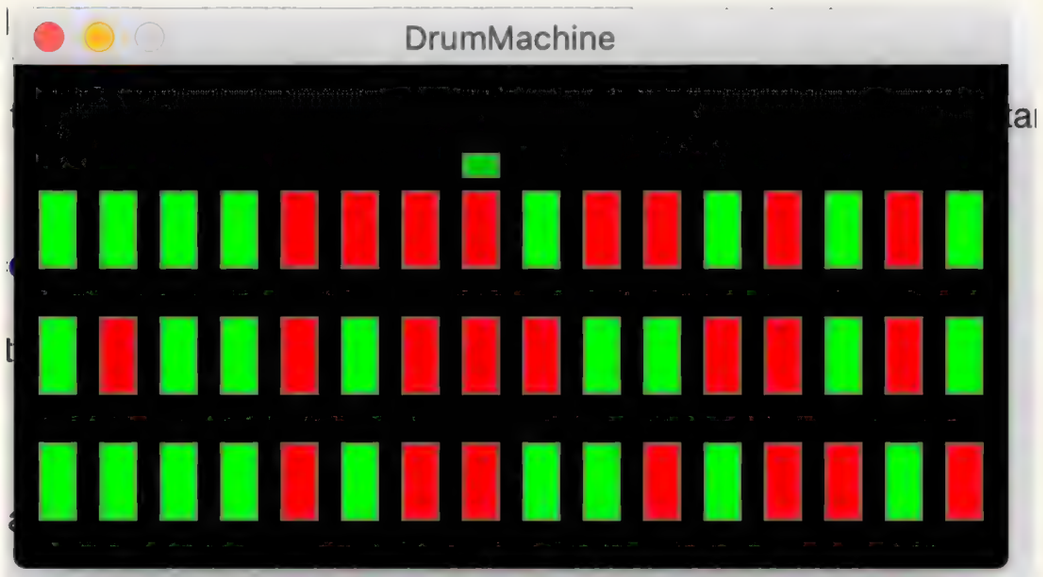
File Name : Beatsam4.svb

Visu 4:

Sequence 1

Sequence 2

Sequence 3



File Name: visu4.png

03 CASE 1: Information 4

Language and Visual Outputs

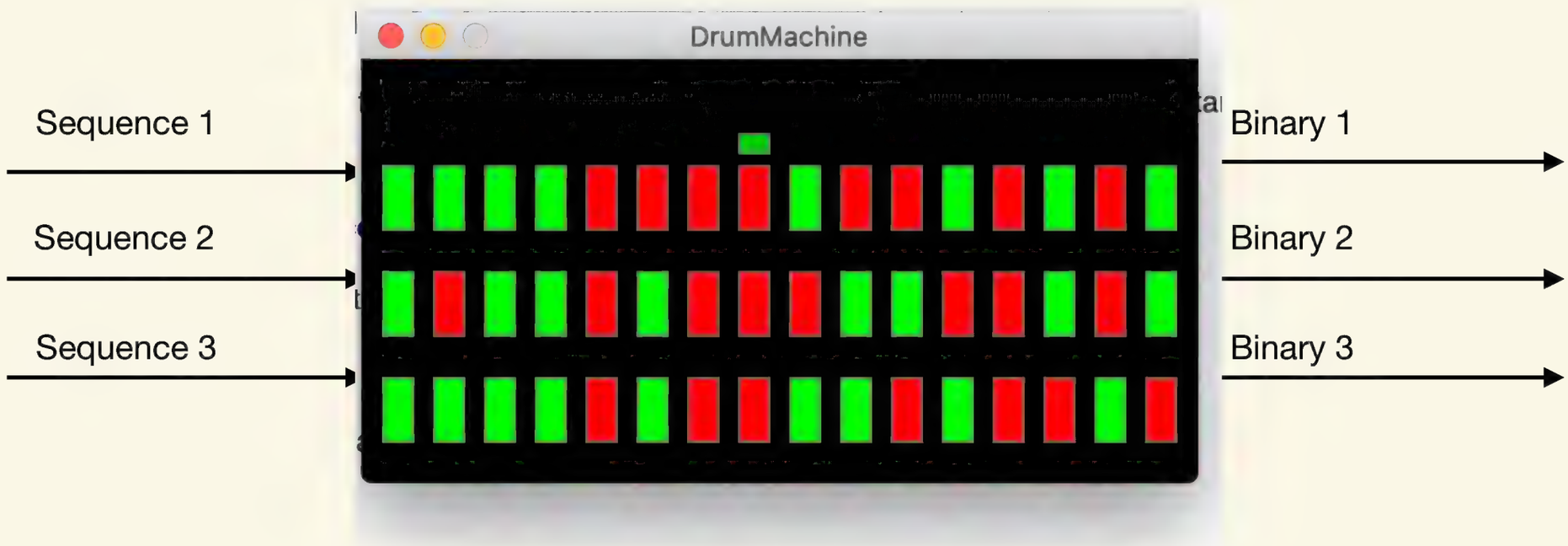
Lang4:

Binary 1: [1,1,1,1,0,0,0,0,1,0,0,1,0,1,0,1]

Binary 2:[1,0,1,1,0,1,0,0,0,1,1,0,0,1,0,1]

Binary 3: [1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0]

Parse 4:



03 CASE 1: LangVisu 5

Language and Visual Outputs

Lang5:

Sequence 1:true,true,true,true,false,false,false,false,true,false,false,true,false,true,false,true

Sequence 2: true,false,false,false,false,true,false,false,true,false,true,false,false,true,false,true

Sequence 3: true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false

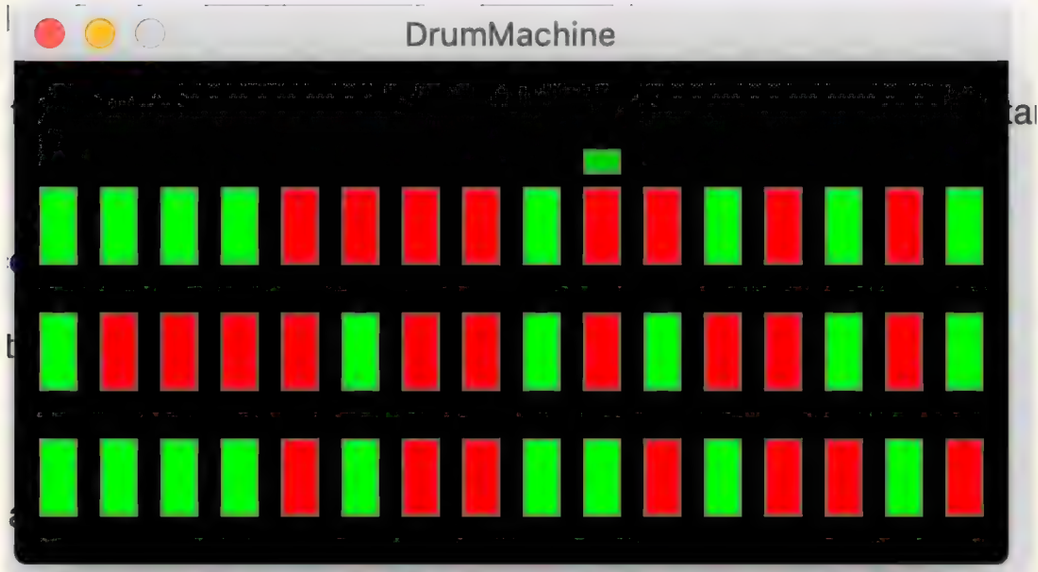
File Name : Beatsam5.svb

Visu 5:

Sequence 1

Sequence 2

Sequence 3



File Name: visu5.png

03 CASE 1: Information 5

Language and Visual Outputs

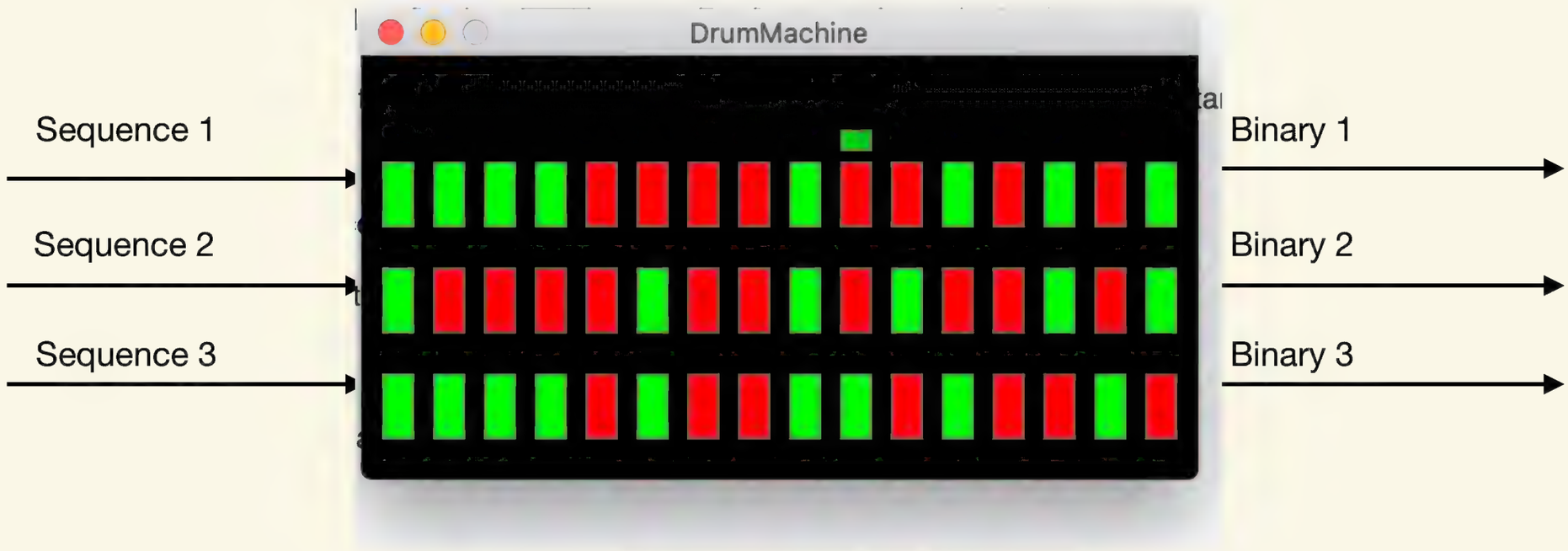
Lang5:

Binary 1: [1,1,1,1,0,0,0,0,1,0,0,1,0,1,0,1]

Binary 2:[1,0,0,0,0,1,0,0,1,0,1,0,0,1,0,1]

Binary 3: [1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0]

Parse 5:



03 CASE 1: LangVisu 6

Language and Visual Outputs

Lang6:

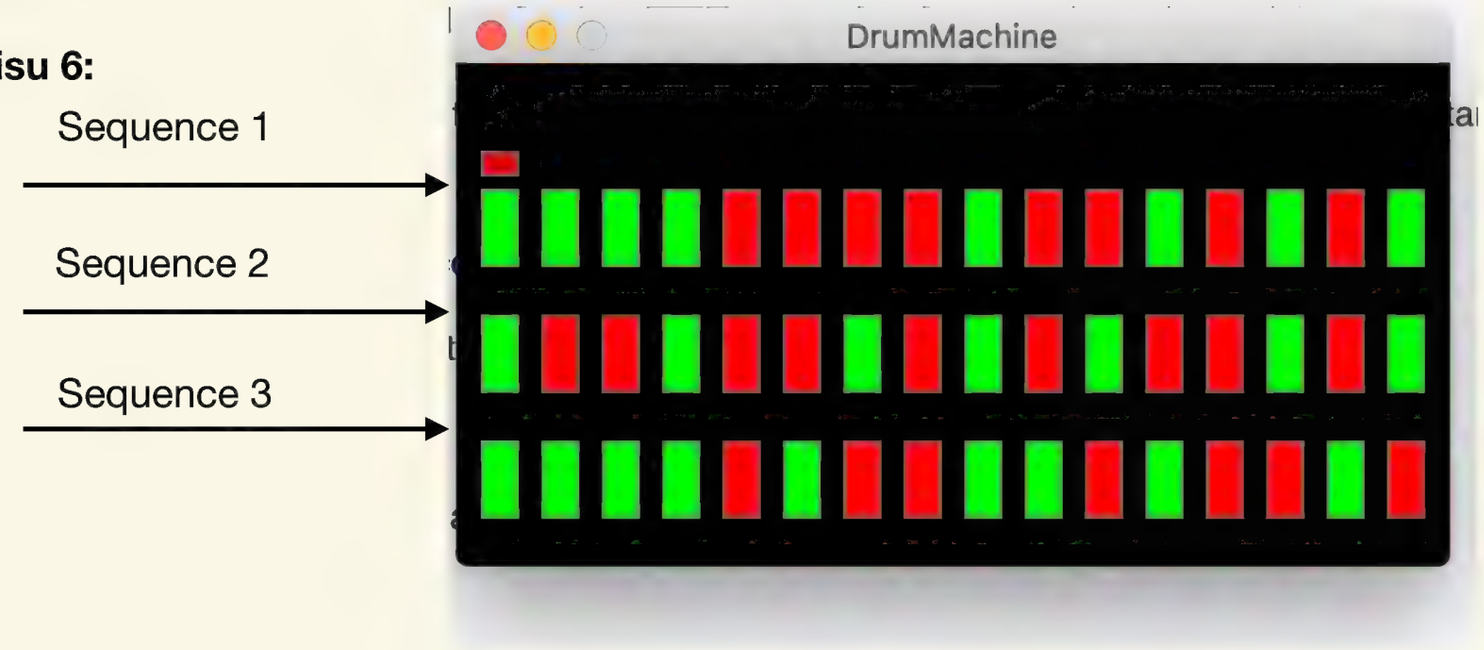
Sequence 1:[true,true,true,true,false,false,false,false,true,false,false,true,false,true,false,true]

Sequence 2:[true,false,false,true,false,false,true,false,true,false,true,false,false,true,false,true]

Sequence 3:[true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false]

File Name : Beatsam6.svb

Visu 6:



File Name: visu6.png

03 CASE 1: Information 6

Language and Visual Outputs

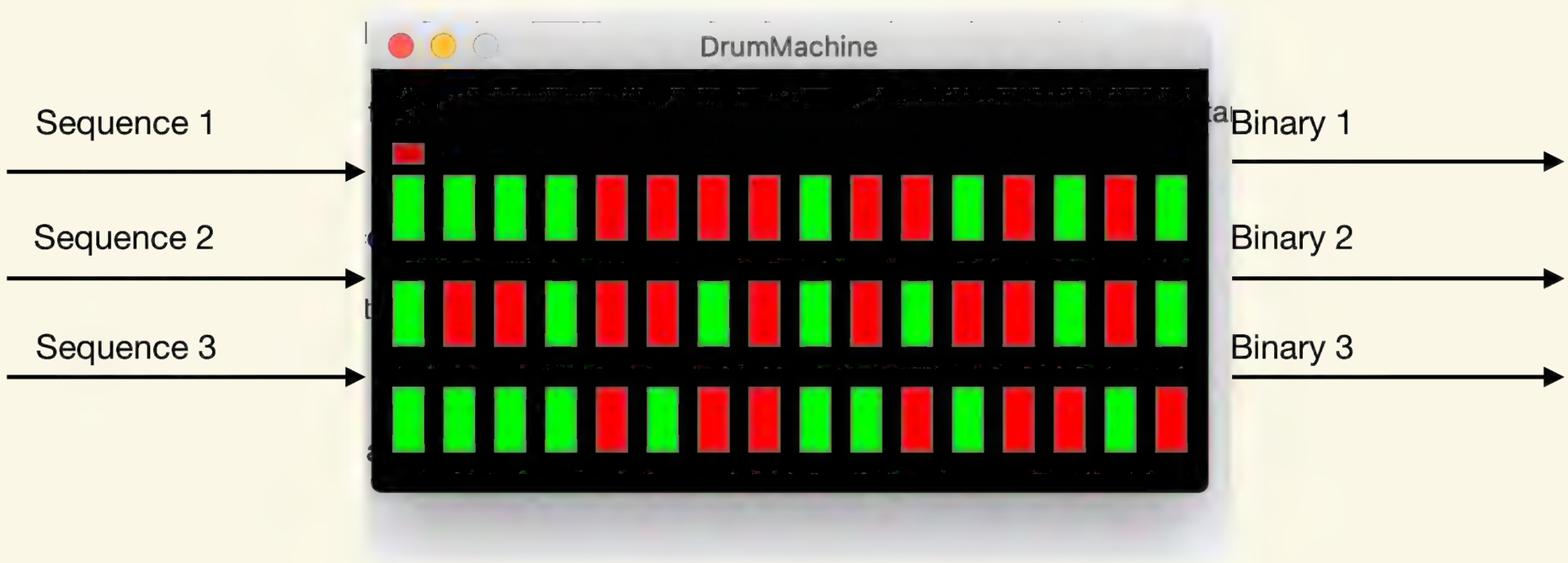
Lang6:

Binary 1: [1,1,1,1,0,0,0,0,1,0,0,1,0,1,0,1]

Binary 2:[1,0,0,1,0,0,1,0,1,0,1,0,0,1,0,1]

Binary 3: [1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0]

Parse 6:



03 CASE 1: LangVisu 7

Language and Visual Outputs

Lang7:

Sequence 1:[false,true,true,true,false,false,true,false,false,false,false,true,false,false,false,true]

Sequence 2:[true,false,true,true,false,true,false,true,false,true,true,false,false,false,false,true]

Sequence 3:[true,true,false,true,false,true,true,false,true,true,false,true,false,true,true,false]

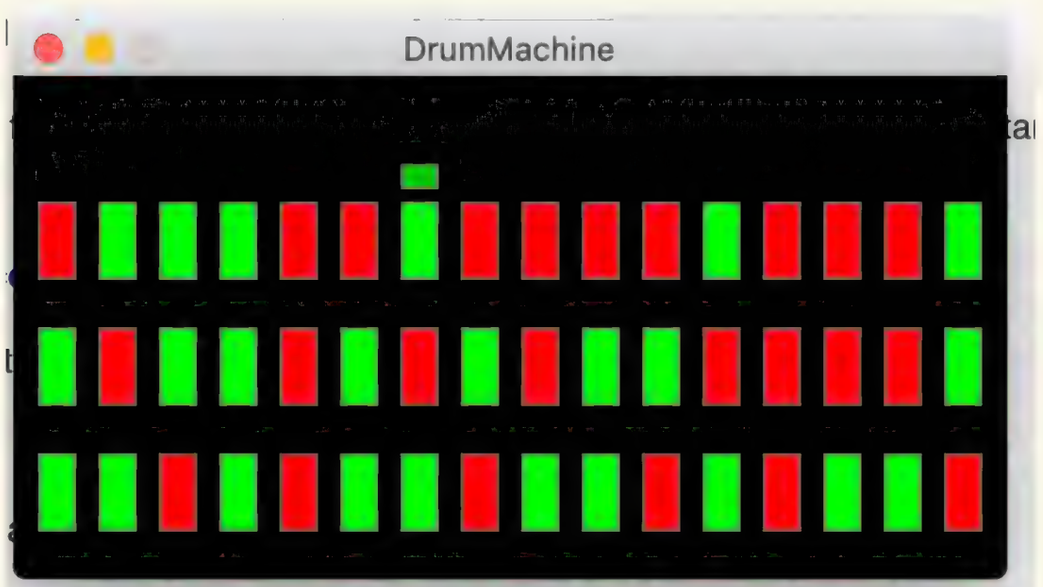
File Name : Beatsam7.svb

Visu 7:

Sequence 1

Sequence 2

Sequence 3



File Name: visu7.png

03 CASE 1: Information 7

Language and Visual Outputs

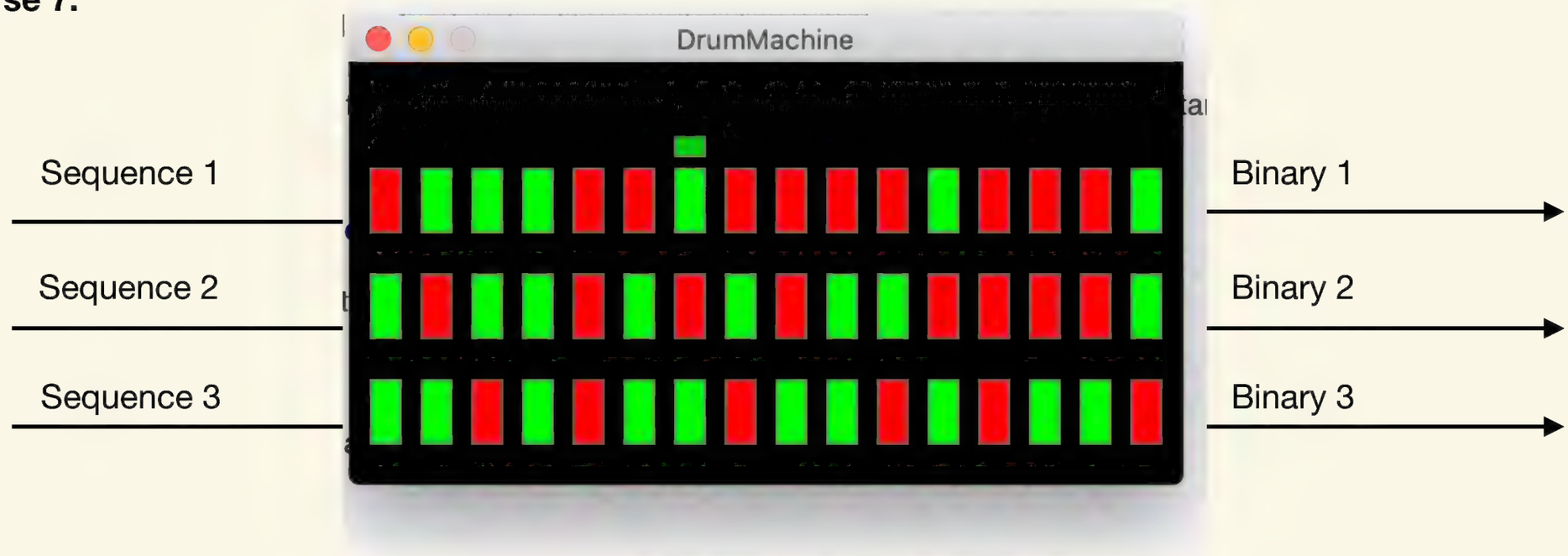
Lang7:

Binary 1:[0,1,1,1,0,0,0,1,0,0,0,1,0,0,0,1]

Binary 2:[1,0,1,1,0,1,0,1,0,1,1,0,0,0,0,1]

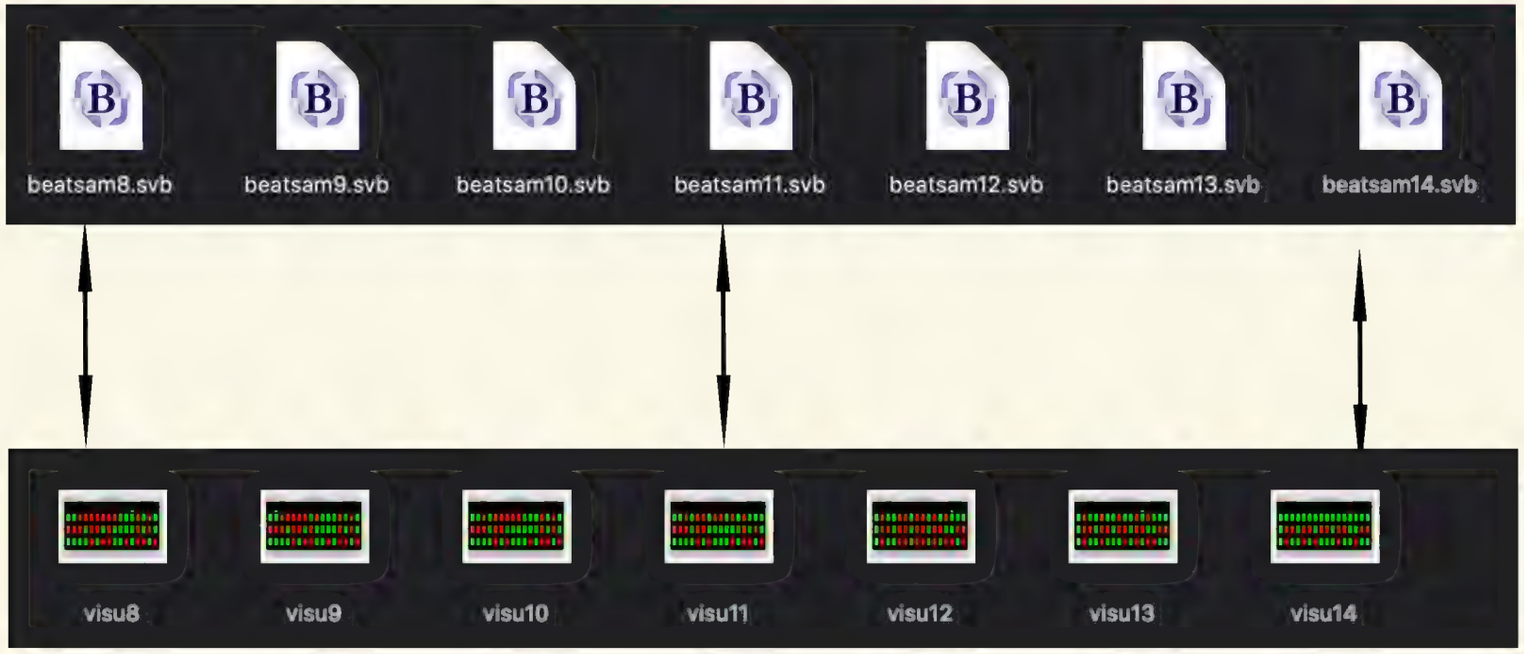
Binary 3: [1,1,0,1,0,1,1,0,1,1,0,1,0,1,1,0]

Parse 7:



03 LangVisu 2

Language and Visual Outputs



There are about 7 corresponding participant images both the language and visual outputs in this experimental group with variable, langvisu 2. The case-level of participation images is from 8 to 14. The control group of unselected participatory information is about 20.

03 CASE 2: LangVisu 1

Language and Visual Outputs

Lang1:

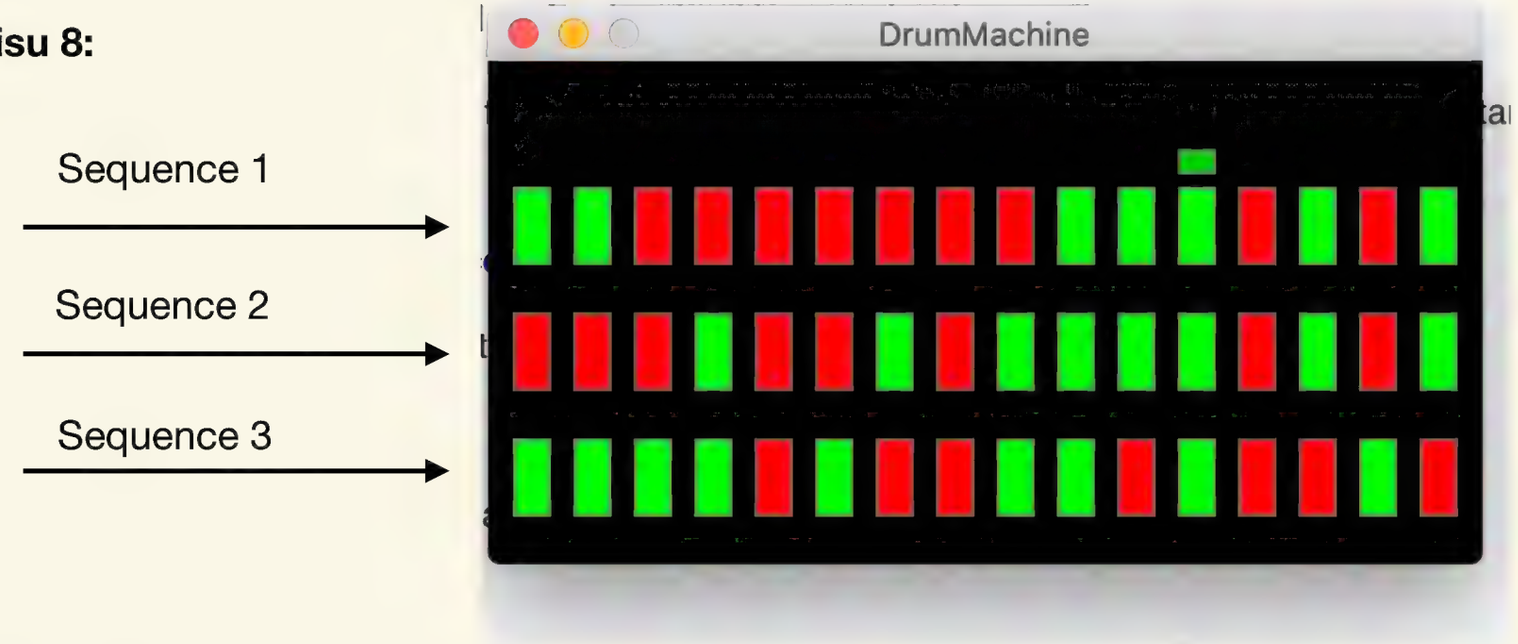
Sequence 1: true,true,false,false,false,false,false,false,false,true,true,true,false,true,false,true

Sequence 2:false,false,false,true,false,false,true,false,true,true,true,true,false,true,false,true

Sequence 3:true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false

File Name : Beatsam8.svb

Visu 8:



File Name: visu8.png

03 CASE 2: Information 1

Language and Visual Outputs

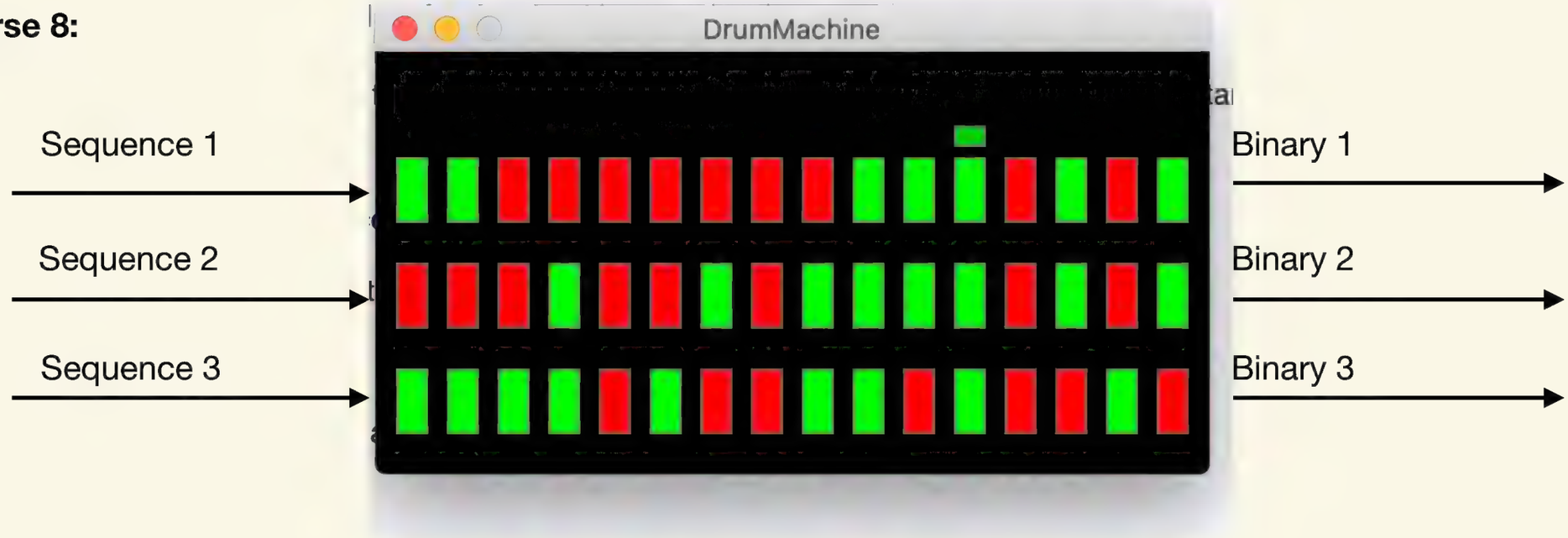
Lang8:

Binary 1: [1,1,0,0,0,0,0,0,0,1,1,1,0,1,0,1]

Binary 2: [0,0,0,1,0,0,1,0,1,1,1,1,0,1,0,1]

Binary 3: [1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0]

Parse 8:



03 CASE 2: LangVisu 2

Language and Visual Outputs

Lang9:

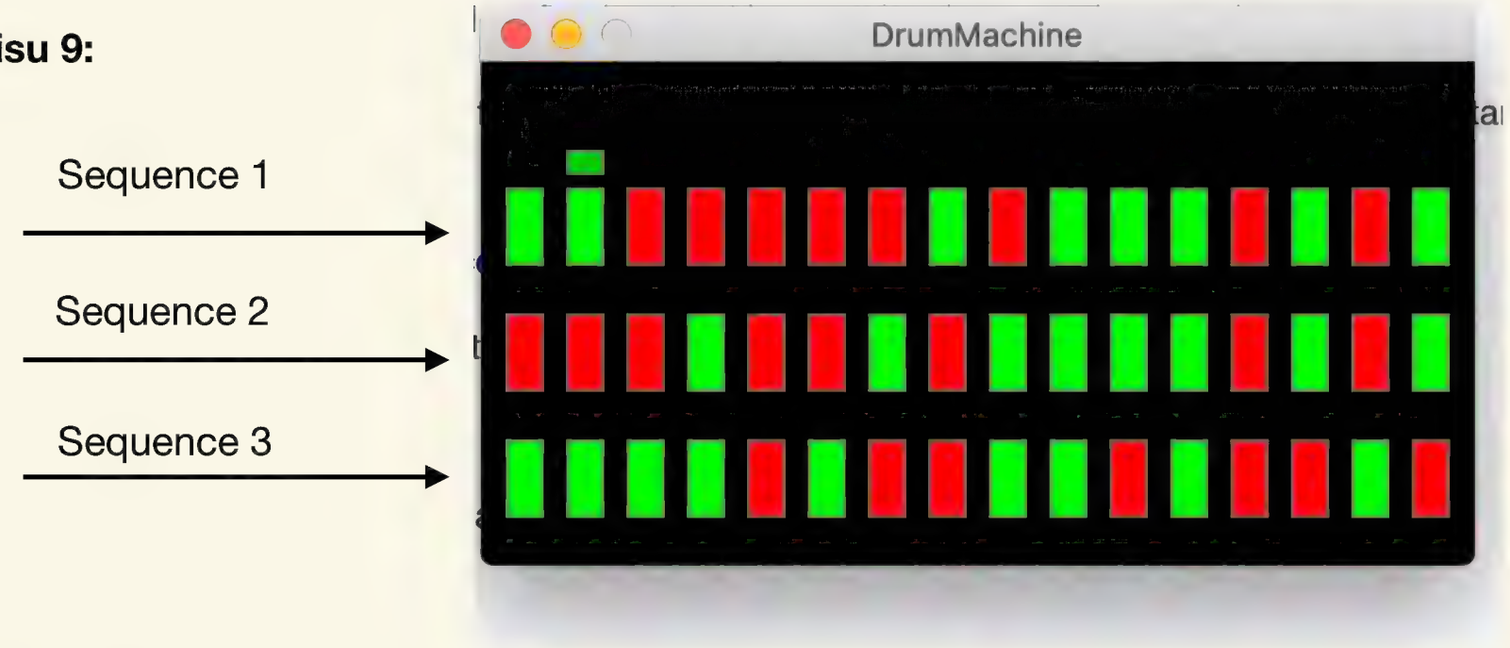
Sequence 1: true,true,false,false,false,false,false,true,false,true,true,true,false,true,false,true

Sequence 2: false,false,false,true,false,false,true,false,true,true,true,true,false,true,false,true

Sequence 3:true,true,true,true,false,true,false,false,true,true,false,true,false,false,true,false

File Name : Beatsam9.svb

Visu 9:



File Name: visu9.png

03 CASE 2: Information 2

Language and Visual Outputs

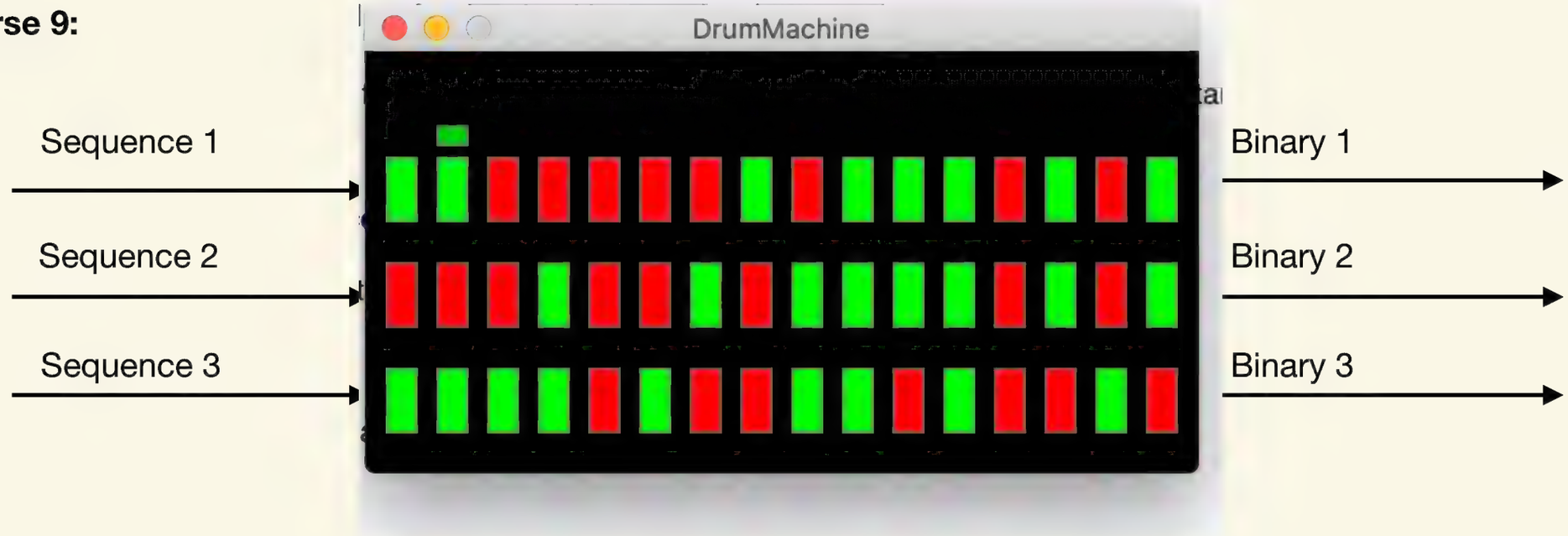
Lang9:

Binary 1: [1,1,0,0,0,0,0,1,0,1,1,1,0,1,0,1]

Binary 2: [0,0,0,1,0,0,1,0,1,1,1,1,0,1,0,1]

Binary 3: [1,1,1,1,0,1,0,0,1,1,0,1,0,0,1,0]

Parse 9:



03 CASE 2: LangVisu 3

Language and Visual Outputs

Lang10:

Sequence 1: true,true,false,true,false,false,false,false,false,true,true,true,false,true,false,true

Sequence 2:false,false,false,true,false,false,true,true,true,true,true,true,false,true,false,true

Sequence 3:true,true,true,true,false,true,false,true,true,true,false,true,false,false,true,false

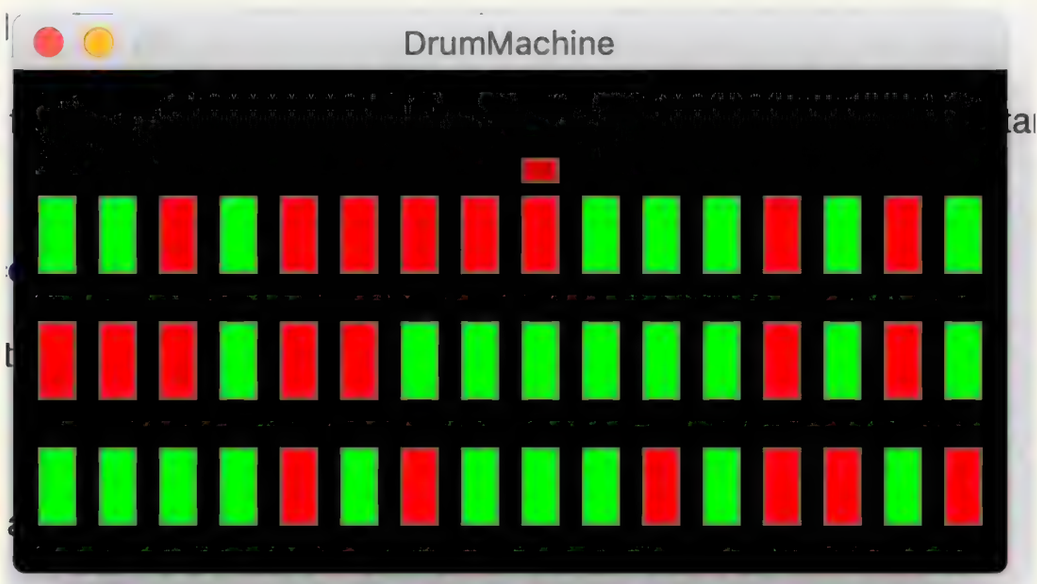
File Name : Beatsam10.svb

Visu 10:

Sequence 1 →

Sequence 2 →

Sequence 3 →



File Name: visu10.png

03 CASE 2: Information 3

Language and Visual Outputs

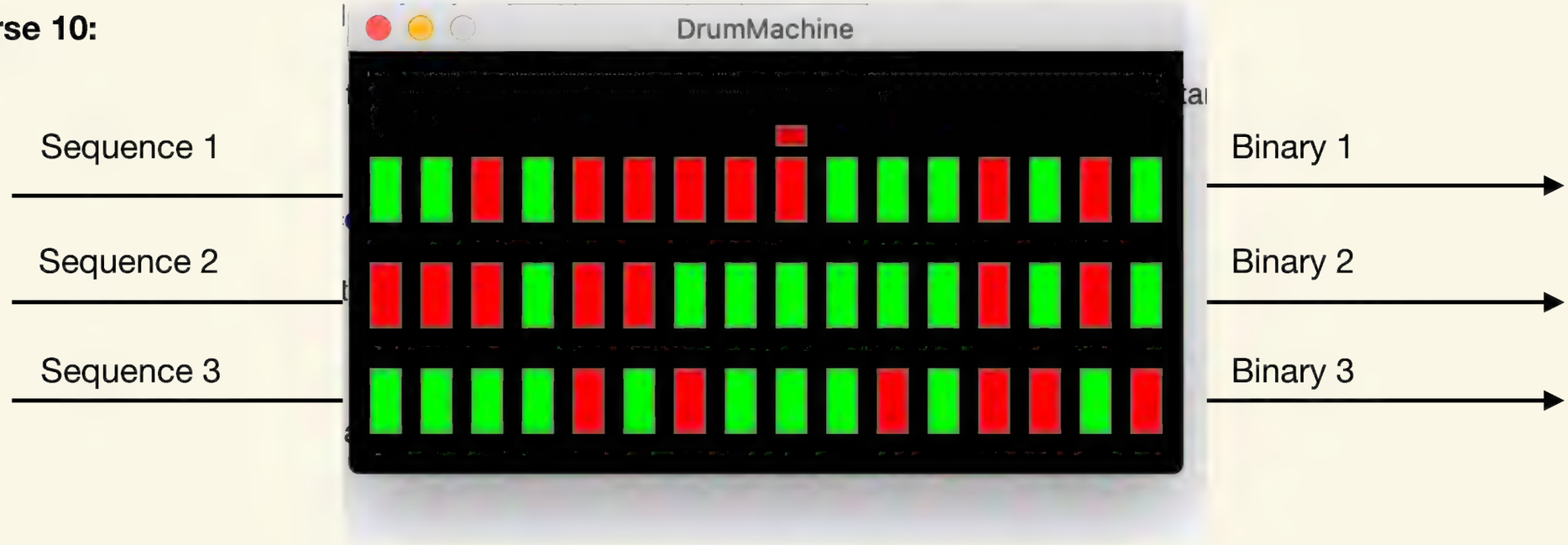
Lang9:

Binary 1: [1,1,0,1,0,0,0,0,0,1,1,1,0,1,0,1]

Binary 2: [0,0,0,1,0,0,1,1,1,1,1,1,0,1,0,1]

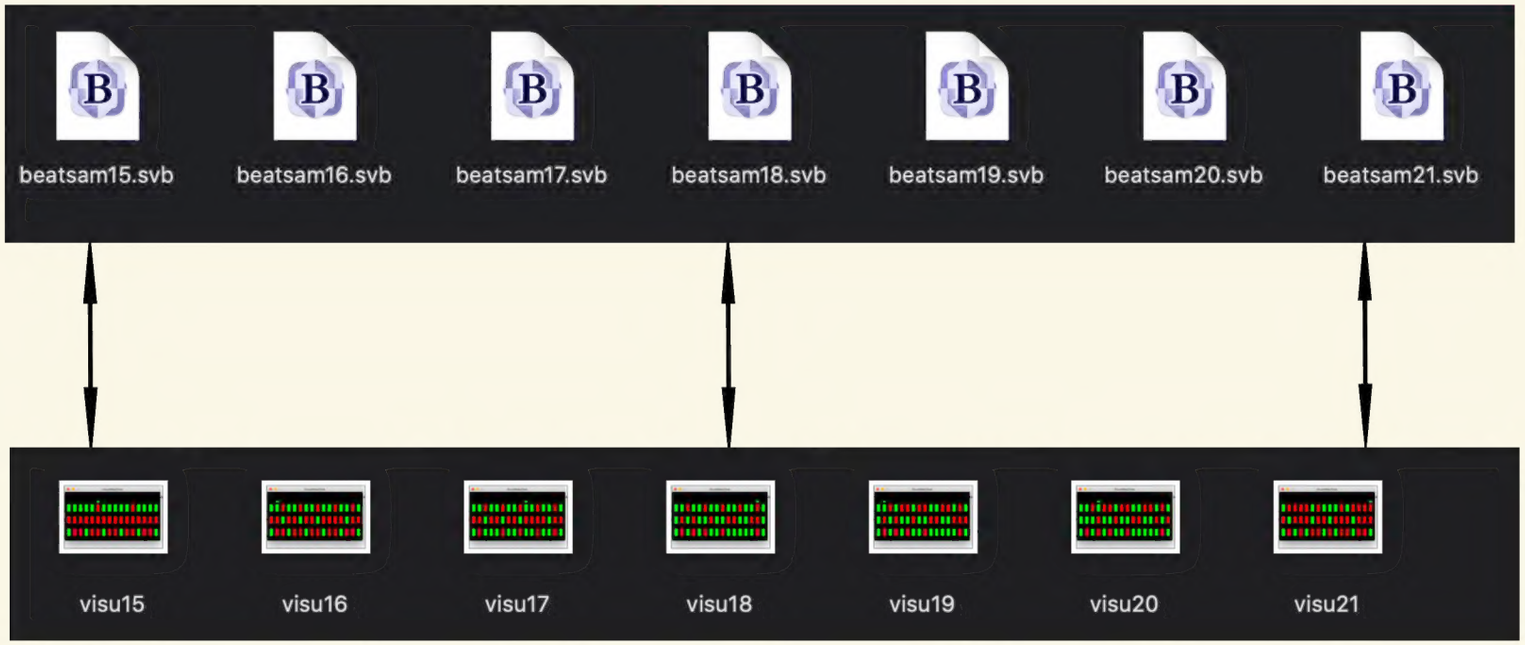
Binary 3: [1,1,1,1,0,1,0,1,1,1,0,1,0,0,1,0]

Parse 10:



03 LangVisu 3

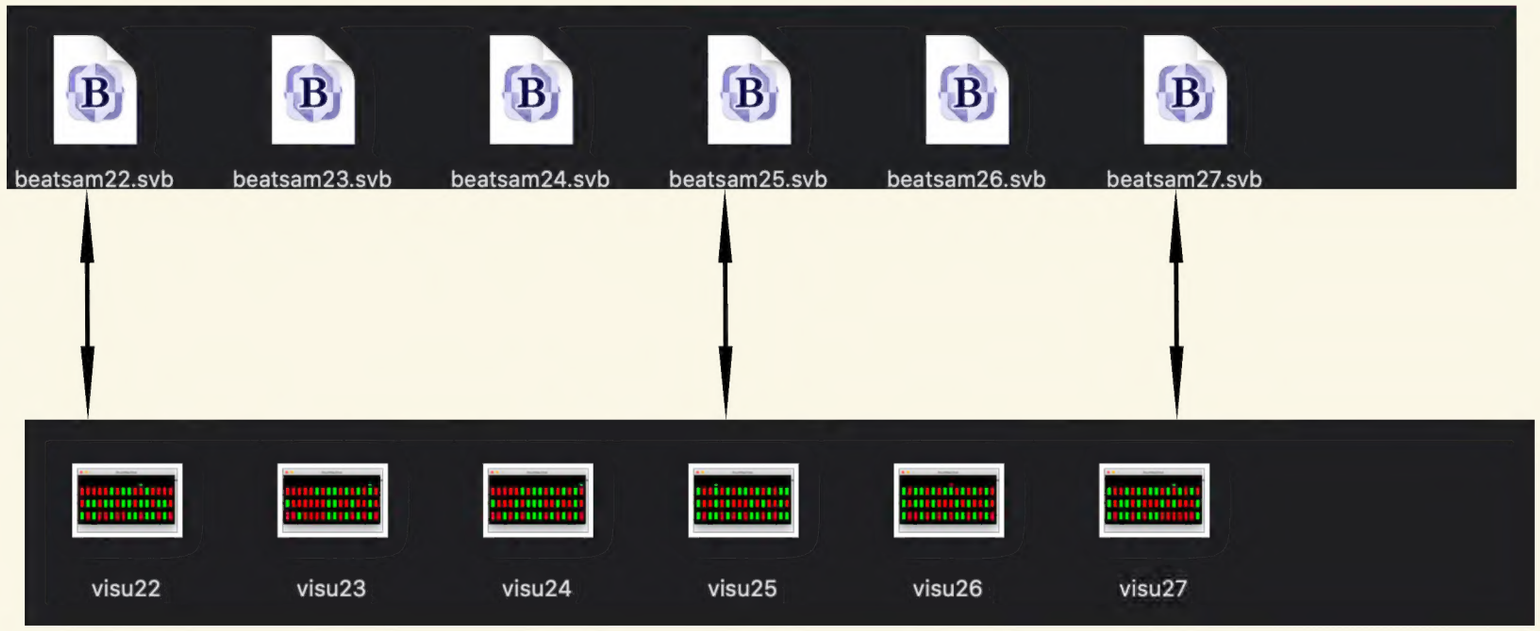
Language and Visual Outputs



There are about 7 corresponding participant images both the language and visual outputs in this experimental group with variable, langvisu 3. The case-level of participation images is from 15 to 21. The control group of unselected participatory information is about 20.

03 LangVisu 4

Language and Visual Outputs



There are about 6 corresponding participant images both the language and visual outputs in this experimental group with variable, langvisu 4. The case-level of participation images is from 22 to 27. The control group of unselected participatory information is about 19.

03 VISUAL INFORMATION

VISUALS DOWNLOAD

The visuals for langvusi 3 and 4 should be downloaded from the web archive, http:://www.archive.org/@frankappiah.

The whole visual information can be found there.

04 CONCLUSION

Further Reading

1. Cemgil A. T., Kappen H. J., Barber D. A generative model for music transcription. IEEE Trans Audio Speech Language Process. 14.2(Mar. 2006), 679-694.
2. R Pasnau. What is Sound?.The Philosophical Quarterly 1999. academic.oup.com
3. R Altman. Sound Theory, sound practice. books.google.com. 1992.
4. A Farnell. Designing Sound. books.google.com 2010
5. JW Strutt, JWS Rayleigh. Theory of Sound. books.google.com. 1877
6. Edmund Gurney. The power of sound. books.google.com 2011

This is about Sound Informatics discipline. It describes sound types that we hear. Then to SoundVision application developed in Java Processing IDE for creating sound by software notes. SoundVision creates an interface for designing and implementing an assistive sound design and music composition with Minim Library. The visual method used in generating the signals to make sound is presented and illustrated. The different types of sound visuals generated a tick sound with off or on notes instrument that is programmed to play a wav recorded sound. These experimental groups of visuals made from software are layouts of repeated attempts to make Sound Informatics interesting.